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method of introducing bibliography into textbooks.

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SOCIETIES AND ACADEMIES.

ACADEMY OF SCIENCE OF ST. LOUIS.

At the meeting of June 1, 1903, Drs. B. M. Bolton and D. L. Harris exhibited sections cut after infiltration with agar-agar, and described the use of this material for embedding purposes as follows:

Tissues can be readily hardened and embedded for cutting into sections in a hot solution of agar-agar containing formalin. The proportions of the mixture which have so far yielded the best results are nine parts of a five per cent. aqueous solution of agar-agar to one part formalin. This mixture can be prepared beforehand and kept indefinitely in an air-tight vessel. The agar-agar should be boiled for several hours, and after the addition of the formalin allowed to clear by sedimentation. The bits of tissue to be embedded are placed in a wide test-tube or wide-mouth vial containing the mixture previously melted. This is kept at 65–70° C. for an hour or longer, and the tissues are ready to be blocked. After attaching to blocks they are placed in strong or absolute alcohol for an hour or two and can then be cut. It is important not to use dilute alcohol. The tissues are stuck to the blocks by means of the agar-agar itself and adhere as soon as the agar becomes cold. No previous hardening of the tissues is at all necessary; fresh tissues can be placed at once into the hot agar-agar-formalin mixture; in fact, fresh tissue is more desirable than that which has been previously hardened, though this can also be readily embedded by this method. But the main advantage of the method, aside from its convenience and simplicity, is the fact that the cells of the tissues are not at all contracted or shrunk, and the ordinary methods of hardening have this effect more or less. With sections prepared from fresh tissues by this method the cell-protoplasm fills out the membrane fully, and the granules of the protoplasm, the nuclei, and the cell contours are remarkably distinct. The

whole process, hardening, embedding and cutting, does not occupy more than three or four hours, where the tissues are not larger than about one centimeter in diameter.

Professor A. W. Greely presented the results of an investigation of the relations of *Paramœcia* and other protozoa to chemical and electrical stimuli. A detailed account of this investigation has been contributed to SCIENCE.

WM. TRELEASE,

Recording Secretary.

THE GEOLOGICAL SOCIETY OF WASHINGTON.

At the 143d meeting of the society, held in the assembly hall of the Cosmos Club, Wednesday evening, April 22, 1903, a general discussion on the problem of the occurrence and storage of crude petroleum and petroleum products was opened by Dr. David T. Day in a paper entitled 'Experiments on the Diffusion of Crude Petroleum through Fuller's Earth.'

Dr. Day reviewed a series of experiments which he has been carrying on intermittently within the last five years on the changes which take place in crude oils by diffusion through various porous substances.

It was found that if crude petroleum were allowed to pass slowly through finely pulverized fuller's earth, it became separated by fractional diffusion into a series of oils differing in color and specific gravity from the original product, and representing the comparatively simple oils of which the complex crude petroleum is composed. In color the fractions varied from the dark brown or amber of the crude to the clear white of refined petroleum, and variations in specific gravity from .70 to .85 were secured.

An account was given of a series of experiments conducted by Professor Engler, to determine the nature of the changes which took place in the oil. Professor Engler's conclusion was that no chemical change whatever took place in the process of diffusion, the differences in the resulting products being entirely physical.

Experiments as to the effectiveness of various diffusion media tended to prove that the best results are invariably attained by the use

of fuller's earth. Quartz sand and amorphous silica exhibit practically no selective action. Powdered limestone was equally ineffective. Different clays show greatly differing capacity for separating the petroleum oils, the greatest effectiveness being secured as the clay approaches fuller's earth in composition and texture.

Interesting practical and scientific suggestions made by Dr. Day as a result of his experiments were, first, that the great variety in color, specific gravity, viscosity, etc., of the different Pennsylvania oils may be due to differences in amount of diffusion suffered by these oils in passing upward through Carboniferous shales from a common source, rather than to differences in original composition; and a corollary of this suggestion is that these oils and those of the Trenton district in western Ohio may have an identical original source far down in the geologic column, the present differences being due to the greater diffusion suffered by the Pennsylvania oils in passing upward through the intervening strata to the horizons in which they are now found.

An examination of the Texas oils shows that they contain considerable amounts of constituents which are most easily removed by diffusion, the conclusion being, therefore, that they are nearer the original source than the Ohio and Pennsylvania oils.

At the conclusion of Dr. Day's paper a number of geologists, among them Messrs. Hill, Eldridge, Hayes, Adams, Butts and Fuller, discussed various phases of the problem of the origin and storage of the fluid and gaseous hydrocarbons, the suggestions of Dr. Day as to the competency of fractional distillation by diffusion to account for the present differences in native oils, and the further suggestions of a common origin for many of them being regarded as of particular interest.

W. C. MENDENHALL,
Secretary.

DISCUSSION AND CORRESPONDENCE.

THE PROPOSED BIOLOGICAL LABORATORY AT THE TORTUGAS.

TO THE EDITOR OF SCIENCE: Since the subject of a research laboratory in or near the

tropics is under discussion, I would like to have the privilege of a few comments. For the last two years I have been discussing the matter privately with a number of people who are interested in establishing a subtropical biological laboratory. This is by no means new, since an attempt was made a few years ago to carry on research work at Bimini, an island about fifty miles east of Miami. At another time the question of locating a laboratory at Miami was under discussion, and my department (biology) at the Florida Agricultural College pledged a small sum to aid in the expense of carrying on this work.

The advantages of establishing such a laboratory at Miami may be stated as follows: (1) Miami is about one degree of latitude south of the northern limits of the Antillean flora. (2) The city is located on the Biscayne Bay, a magnificent sheet of water that is always navigable to sail-boats and launches. (3) The Gulf Stream is within easy reach, being only about six or seven miles out, cat-boats and launches making one or two trips a day during the tourist season. (4) The Miami River, Little River and other streams, which drain the everglades, may be explored easily for fresh-water forms. (5) The everglades can be reached by row-boat or bicycle, macadamized roads having been built to the edge of the glades. This vast unexplored region, about which so many erroneous ideas are abroad, is now open for botanical exploration. (6) Miami is within twenty-four hours of Havana and twelve hours of Key West by steamer. Washington can be reached in thirty-six hours. (7) Launches and sail-boats may be chartered at any time at reasonable rates. (8) Miami is located south of the 26th degree of north latitude.

At the present time the tropical laboratory has only one room which can be offered to visiting biologists. This has been in almost constant use during the past year. Among those who have taken advantage of this opportunity are Professors V. M. Spalding and J. H. Comstock.

There can be no doubt as to the healthfulness of the location, and the comforts of life